OFFICIAL AMENDMENT **OFFICIAL AMENDMENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of

Applicants : David R. Hembree et al.
Serial No. : 09/510,828
Filed : February 23, 2000
Title : A SPRING ELEMENT FOR USE IN AN APPARATUS FOR ATTACHING TO A SEMICONDUCTOR AND A METHOD OF MAKING
Docket No. : MIO0020VA (97-0198.02)
Examiner : J. Mitchell
Art Unit : 2827
Confirmation : 4071

Assistant Commissioner for Patents
Washington, D.C. 20231

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C., on April 17, 2002.

Thomas E. Lees — 46,867 Reg. No.

Sir:

RESPONSE

This paper is being filed in response to the Office Action dated February 26, 2002 in the identified application, having a reply due date of May 26, 2002. Reconsideration is respectfully requested in light of the remarks below.

IN THE CLAIMS

The entire set of presently pending claims is reproduced below for the convenience of the Examiner. The claims have not been amended.

29. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device arranged to press said semiconductor against said interconnect structure to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment

device comprising a spring element including an elastic member comprised of a first elastomeric material, and a conductive member.

30. The apparatus of claim 29, wherein said conductive member comprises a plurality of conductive particles.

31. The apparatus of claim 29, wherein said plurality of conductive particles are interspersed within said elastomeric member.

36. The apparatus of claim 29, wherein said conductive member is comprised of conductive material selected from the group consisting of gold, aluminum, nickel, silver stainless steel, and alloys thereof.

37. The apparatus of claim 29, wherein said semiconductor is electrically biased through said spring element.

38. The apparatus of claim 29, wherein said semiconductor comprises a semiconductor die.

39. The apparatus of claim 29, wherein said semiconductor comprises a semiconductor die formed within a semiconductor package.

40. The apparatus of claim 39, wherein said semiconductor package comprises a package selected from the group consisting of a chip-scale package, a ball grid array, a chip-on-board, a direct chip attach, and a flip-chip.

44. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device arranged to press said semiconductor against said interconnect structure to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including a conductive member and a first elastic member comprised of a first elastomeric material having first force transfer characteristics, said first elastic member having a plurality of holes formed therein such that said spring element has overall force transfer characteristics different from said first force transfer characteristics.

45. The apparatus of claim 44, wherein said spring element further comprises an elastic member comprised of a second elastomeric material having second force transfer characteristics, said second elastic member positioned in at least one of said plurality of holes formed in said first elastic member such that said overall force transfer characteristics are different from said first and second force transfer characteristics.

46. The apparatus of claim 44, wherein said spring element further comprises a plurality of second elastic members positioned in a plurality of said plurality of holes in said first elastic member.

47. The apparatus of claim 44, wherein said conductive member comprises a plurality of conductive particles.

50. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device arranged to press said semiconductor against said interconnect structure to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including an elastic member comprised of a conductive member and an elastomeric material having first force transfer characteristics, said first elastic member having at least one hole formed therein such that said spring element has overall force transfer characteristics different from said first force transfer characteristics, said elastic member being shaped so as to engage an outer edge of said semiconductor such that a force applied by said attachment device as said semiconductor is pressed by said attachment device against said interconnect structure is substantially uniform around said semiconductor.

51. The apparatus of claim 50, wherein said conductive member comprises a plurality of conductive particles.

54. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device pressing said interconnect structure against said semiconductor to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including a first conductive member, a first elastic member and a second elastic member, said first elastic member comprising a first elastomeric material having first force transfer characteristics and said second elastic member comprising a second elastomeric material having second force transfer characteristics, said second elastic member being positioned within said first elastic member such that said spring element

has overall force transfer characteristics different from said first and second force transfer characteristics.

55. The apparatus of claim 54, further comprising a plurality of said second elastic members formed within said first elastic member.

56. The apparatus of claim 54, wherein said conductive member comprises a plurality of conductive particles.

63. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device arranged to press said semiconductor against said interconnect structure to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including a conductive member and an elastic member comprised of an elastomeric material having first force transfer characteristics, said elastic member having at least one cavity formed therein such that said spring element has overall force transfer characteristics different from said first transfer characteristics of said elastomeric material.

64. The apparatus of claim 63, wherein said elastic member has a plurality of cavities formed therein.

65. The apparatus of claim 63, wherein said conductive member comprises a plurality of conductive particles.

68. An apparatus for attaching to a plurality of contacts of a semiconductor, said apparatus comprising:

an interconnect structure comprising a plurality of conductors patterned to match corresponding ones of said plurality of contacts of said semiconductor; and

an attachment device pressing said interconnect structure against said semiconductor to provide an electrical connection between said plurality of conductors and said corresponding ones of said plurality of contacts, said attachment device comprising a spring element including a conductive member and an elastic member having a variable spring constant.

69. The apparatus of claim 68, wherein said conductive member comprises a plurality of conductive particles.

73. The apparatus of claim 29, wherein said conductive member comprises carbon.

REMARKS

Claims 29-31, 36-40, 44-47, 50, 51, 54-56, 63-65, 68, 69, and 73 are pending in the present application. The claims have not been amended.

Rejection Under 35 U.S.C. §102(e)

Claims 29-31, 37, and 38 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6, 091,251 issued July 18, 2000 to Wood et al. (hereinafter "Wood"). According to the M.P.E.P. §706.02, in order to be anticipating under §102, the reference must teach every aspect of the claimed invention. See Carella v. Starlight Archery and Pro Line Co., 804 F.2d 135, 138, 231 U.S.P.Q. 644, 646 (Fed. Cir. 1986).

With regard to independent claim 29, the Applicants believe that the Examiner has not met the burden of establishing a *prima facie* case of anticipation under 35 USC §102. The Examiner argues that Wood teaches among other things, an interconnect structure, and a spring that inherently comprises conductive particles. However, as will be set out more fully herein, Wood teaches either the use of an interconnect device or the use of a conductive polymer in lieu of the interconnect.

Wood fails to teach an apparatus comprising both an interconnect structure and an attachment device arranged to press a semiconductor against the interconnect structure, the attachment device comprising a spring element including an elastic member and a conductive member as recited in claim 29.

Wood teaches several embodiments of testing apparatus. The first embodiment of Wood is shown in Figs. 1-3. In this embodiment, Wood teaches an apparatus comprising an interconnect device. As best seen in Figs. 1-3, Wood teaches placing a semiconductor in a die-receiving cavity 17 of a burn in fixture 11. Contact between bondpads 27 of a semiconductor die 21 and the external connector leads 33 of the burn in fixture is

established by using an interconnect (41, 43, 45) comprising non-bonded TAB (tape automated bonding) tape (This is shown in FIG. 3). The non-bonded TAB tape 41 performs a connection function without bonding the TAB tape 41 to the die 21. In order to maintain contact with the bondpads 27, the non-bonded TAB tape 41 is biased against the die 21 by a compressible elastomeric strip 53 (Col. 5, lines12-17). However, the specification does not teach or suggest that the spring 53 comprises a conductive member. And, as polymeric elastomers are conventionally non-conductive, unless specifically made to be conductive, one skilled in the art would understand that resilient elastomer strip 53 was not electrically conductive. This conclusion is supported by the fact that when Wood does use a conductive polymer (e.g., conductive polymers 73 and 93), Wood specifically identifies it as such.

In a second embodiment of Wood shown in Fig. 4, and described above, the elastomeric strip 53 is removed, and the interconnect device (41, 43, 45) is replaced with conductive polymer contacts 73. The conductive polymer contacts 73 route electrical signals to contacts 75. As can be seen in Fig. 4, the conductive polymer contacts 73 connect to the connector leads 33 of the burn in fixture 11 by electrical contacts 75 within the polymer contacts itself. Accordingly, the conductive polymer contacts 73 and electrical signal contacts 75 replace the interconnect device (41, 43, 45) illustrated in Figs. 1-3. Accordingly, the embodiment of Fig. 4 fails to teach both an interconnect structure, and an attachment device arranged to press a semiconductor against the interconnect structure, the attachment device comprising a spring element including an elastic member and a conductive member.

The third embodiment of Wood is shown in Fig. 5, and is similar to that shown in Fig. 4. Again, conductive polymer contacts 93 are used. One difference between the Fig. 4 and Fig. 5 embodiments is that in Fig. 5 the die is placed into the burn in fixture 11 face down (Col. 5, lines 47-50). As with the embodiment of Fig. 4, the third embodiment of

Wood fails to teach both an interconnect structure, and an attachment device arranged to press a semiconductor against the interconnect structure, the attachment device comprising a spring element including an elastic member and a conductive member.

The fourth embodiment of Wood is shown in Fig. 6. In this embodiment, a biasing plate 115 biases the die. There is no mention at all that the biasing plate comprises a conductive member. Further, this embodiment does not teach an *interconnect structure*.

The fifth embodiment of Wood shown in Fig. 7. In this embodiment, a resilient pad 135 is used to bias a semiconductor. The specification does not teach or suggest that the resilient pad 135 has a conductive member. Further, this embodiment does not teach *an interconnect structure*. Rather, as can be seen, pin type contacts 123 are used to route semiconductor bond pads to the connector leads of the burn in device.

The sixth embodiment of Wood is shown in Fig. 8. As can be seen in Fig. 8, there is no spring, nor is there an interconnect device. Rather, TAB tape is retained to the die (Col 6, lines 11-14).

Accordingly, Wood fails to teach both an interconnect structure and an attachment device arranged to press a semiconductor against the interconnect structure, the attachment device comprising a spring element including an elastic member and a conductive member. As Wood fails to anticipate the claimed invention, the applicants request the Examiner to withdraw the rejection to claim 29, and the claims that depend therefrom, under 35 USC §102(e).

While it is clear that Wood does not anticipate the claimed invention, it shall be observed that Wood does not render the claimed invention obvious. One reason for this is that Wood is not prior art for purposes of 35 U.S.C. §103.

This application is a divisional of US Patent Application Serial No. 09/026,080, filed February 19, 1998, which is a continuation in part of US Patent Application Serial No. 09/009,169 filed January 20, 1998. Accordingly, with respect to the above claims, the effective filing date is at least February 19, 1998. Wood issued July 18, 2000 and has a chain of priority back to June 4, 1991. Accordingly, Wood could only be considered under 35 U.S.C. §103(a) via 35 U.S.C. §102(e).

However, subsection 103(c) clearly states that

> Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

The above-cited version of §103(c) became effective November 29, 1999. This divisional application was filed February 23, 2000.

According the MPEP §706.02(l)(3), common ownership can be established through the assignment records on file at the Patent Office. Micron Technologies, Inc. is the assignee of Wood. This may be verified by checking the recordation found at Reel/Frame 5735/0654, recorded 6/4/91. Further, Micron Technologies, Inc. is the assignee of the pending application. Additionally, at the time the invention was made, the inventors of the subject matter of the present application were under an obligation to assign such invention to Micron Technologies, Inc. Enclosed herewith is "Attachment A", providing a copy of the assignment as filed, as well as copies of the return receipt post card verifying receipt of the Assignment by the PTO.

Accordingly, subsection (c) of Section 103 makes it clear that Wood is <u>not</u> available as prior art in the present application for purposes of an obviousness type of rejection.

This assertion holds true even though the present application and Wood name different inventive entities.

The applicants thank the Examiner for the early indication of allowable subject matter. Further, with respect to the claims that have been objected to, claims 36, 39, 40, and 73 all depend from claim 29, which Applicants assert is patentable over the prior art of record as set out more fully herein. Claims 44, 50, and 63 are already in independent form. Accordingly, Applicants request that the Examiner withdraw the objections to claims 36, 39, 40, 44-47, 50, 51, 63-65, and 73.

CONCLUSION

For all of the above reasons, the applicants respectfully submit that the above claims represent allowable subject matter. The Examiner is encouraged to contact the undersigned to resolve efficiently any formal matters or to discuss any aspects of the application or of this response. Otherwise, early notification of allowable subject matter is respectfully solicited.

Respectfully submitted,
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